

UČNI NAČRT PREDMETA / COURSE SYLLABUS

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|----------------------|-------------------------|
| Predmet: | Biologija celice |
| Course title: | Cell Biology |

| Študijski program in stopnja Study programme and cycle | Študijska smer Study option | Letnik Year of study | Semester Semester |
|---|--------------------------------|-------------------------|----------------------|
| Dentalna medicina/Dental Medicine 2. stopnja/2nd cycle | | 1 | 1 |

Vrsta predmeta / Course type

Obvezni/ Compulsory

Univerzitetna koda predmeta / University course code:

| Predavanja Lectures | Seminar Seminar | Vaje Tutorial | Klinične vaje Clinical training | Druge oblike študija Other forms of study | Samost. delo Individual work | ECTS |
|------------------------|--------------------|------------------|------------------------------------|--|---------------------------------|------|
| 45 | 30 | 45 | | | 60 | 6 |

Nosilec predmeta / Lecturer:

Izr. prof. dr. Saška Lipovšek

Jeziki /

Predavanja / Lectures: slovenščina/slovene

Languages:

Vaje / Tutorial: slovenščina/slovene

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:

Prerequisites:

Vsebina:

Content (Syllabus outline):

Razumevanje biologije celice je temeljno za razumevanje drugih področij biologije in medicine.

Pri predmetu se študenti seznanijo s sodobnimi raziskovalnimi metodami. Študenti spoznajo kemijsko sestavo celic, značilnosti prokariotskih in evkariotskih celic. Poudarek je na študiju struktur in organelov evkariotskih celic ter njihovih funkcijah.

Kratek povzetek vsebin:

1. Organizacija evkariotske in prokariotske celice; celice kot eksperimentalni modeli
2. Molekularna sestava celic
3. Metode proučevanja celic
4. Celične membrane in transport snovi Receptorji
5. Receptorji
6. Ekstracelularni matriks
7. Mitochondriji in mehanizem oksidativne fosforilacije
8. Endoplazemski retikulum in Golgijev aparat
9. Lizosomi in peroksisomi
10. Citoskelet in gibanje celice
11. Jedro, kromatin in kromosomi
12. Celični ciklus, mitoz in mejoza
13. Medcelične komunikacije
14. Apoptoza in nekroza
15. Celice imunskega sistema
16. Maligno transformirane celice
17. Razmnoževanje in razvoj

Understanding of the cell biology is an area of research that is fundamental to all of the biological and medical sciences. This subject provides an introduction to the methods for studying cells. It focuses on the chemical structure of the cells, main characteristics of the prokaryotic and the eukaryotic cells, especially structures and organelles of the eukaryotic cells and their function.

Short abstract of contents:

1. Organization of eukaryotic and prokaryotic cell; cells as experimental models
2. The molecular composition of cells
3. Tools of cell biology
4. Cell membranes and membrane transport
5. Receptors
6. Extracellular matrix
7. Mitochondria and the mechanism of oxidative phosphorylation
8. Endoplasmic reticulum and Golgi Complex
9. Lysosomes and peroxisomes
10. The cytoskeleton and cell movement
11. The nucleus, chromatin and chromosomes
12. Cell cycle, mitosis and meiosis
13. Cell to cell interaction
14. Apoptosis and necrosis
15. Cells of the immune system
16. Malignant transformation
17. Reproduction and development

Temeljni literatura in viri / Readings:

1. Alberts, B., Johnson, A., Lewis, J., Raff, M., Roberts, K., Walter, P., 2014: Molecular Biology of the Cell (6th Ed.), Garland Science, Taylor & Francis Group, New York.
2. Cooper, G. M., Hausman, R. F., 2013: The Cell: A Molecular approach (6th Ed.). ASM Press, Washington, D. C.
3. Lodish, H., Berk, A., 2016: Molecular Cell Biology (8th Ed.). W. H. Freeman and Company, New York.
4. Dariš B., Lipovšek S.: Biologija celice: navodila za laboratorijske vaje. Maribor: Univerza v Mariboru, Univerzitetna založba, 2021

Dopolnilno gradivo:

5. Alberts, B., Bray, D., 2016: Essential Cell Biology, Garland Science, Taylor & Francis Group, New York.
6. Pavelka M., Roth J., 2015: Functional Ultrastructure: Atlas of Tissue Biology and Pathology (3rd Ed.), Springer.

Cilji in kompetence:

- Študenti razumejo strukturo, funkcijo in molekularno organizacijo celice.
- Pridobijo poglobljena znanja na specifičnih področjih biologije celice.

Objectives and competences:

- Students understand the structure, the function and the molecular organisation of the cell.
- Students acquire advanced knowledge in specific fields in cell biology.

Predvideni študijski rezultati:**Intended learning outcomes:****Znanje in razumevanje:**

- Študenti razumejo dosežke s področja biologije celice, ki so nujno potrebni na drugih področjih biologije in medicine.
- Študenti spoznajo nekatera področja medicine, kjer uporabljamo znanja biologije celice.

Knowledge and understanding:**Knowledge and Understanding:**

- Students understand achievements in cell biology which is essential for other fields of biology and medicine.
- Students get acquainted with the areas of medicine in which cell biology is applied.

Prenesljive/ključne spretnosti in drugi atributi:

- Študenti pridobijo izkušnje in laboratorijske spretnosti, ki so nujno potrebne pri samostojnem laboratorijskem delu.
- Znajo uporabljati znanstvene prispevke in zahtevnejšo študijsko literaturo.

Transferable/Key Skills and other attributes:

- Students acquire experience and laboratory skills which are essential for an autonomous laboratory work.
- They understand articles in scientific journals and advanced text-books.

Metode poučevanja in učenja:**Learning and teaching methods:**

- Predavanja
- Seminar
- Vaje

- Lectures
- Seminars
- Tutorial (laboratory)

Delež (v %) /**Weight (in %) /****Assessment:****Načini ocenjevanja:**

| Načini ocenjevanja: | Delež (v %) / Weight (in %) / | Assessment: |
|---|----------------------------------|--|
| Način (pisni izpit, ustno izpraševanje, naloge, projekt) | | Type (examination, oral, coursework, project): |
| Pisni praktični kolokvij (30%) | 30 | Written practical examination (30%) |
| Seminar (10%) | 10 | Seminar (10%) |
| Pisni izpit (60%) | 60 | Written final examination (60%) |
| ŠTUDIJSKE OBVEZNOSTI ŠTUDENTOV | | ACADEMIC OBLIGATIONS OF STUDENTS: |
| Prisotnost na vajah | | Each student has to: |
| Napisani protokoli | | - be present on each practical course; |
| Opravljen kolokvij, seminar in izpit | | - write down the protocol on each practical course; |
| POGOJI ZA PRISTOP K POSAMEZNEMU PREVERJANJU ZNANJA | | - pass written practical examination, written seminar and written final examination. |
| Pogoj za pristop h kolokviju: | | REQUIREMENTS FOR ACCESS TO INDIVIDUAL KNOWLEDGE CHECKING: |
| -opravljene vaje; | | - performed practical courses; |
| -napisani protokoli. | | -written protocols. |
| Pogoji za pristop k izpitu: | | CONDITIONS FOR WRITTEN FINAL EXAM: |
| -opravljen kolokvij, seminar | | -performed written practical exam and seminar. |
| Pozitivna ocena: doseženih 50 % in več. | | |

Reference nosilca / Lecturer's references:

LIPOVŠEK DELAKORDA, Saška, NOVAK, Tone, JANŽEKovič, Franc, WEILAND, Nina, LEITINGER, Gerd. Malpighian tubule cells in overwintering cave crickets *Troglophilus cavicola* (Kollar, 1833) and *T. neglectus* Krauss, 1879 (Rhaphidophoridae, Ensifera). *PloS one*, ISSN 1932-6203, 2016, vol. 11, iss. 7.

LIPOVŠEK DELAKORDA, Saška, NOVAK, Tone. Autophagy in the fat body cells of the cave cricket *Troglophilus neglectus* Krauss, 1878 (Rhaphidophoridae, Saltatoria) during overwintering. *Protoplasma*, ISSN 0033-183X, 2016, vol. 253, iss. 2, str. 457-466.

LIPOVŠEK DELAKORDA, Saška, NOVAK, Tone, JANŽEKovič, Franc, LEITINGER, Gerd. Changes in the midgut diverticula in the harvestmen *Amilenus aurantiacus* (Phalangiiidae, Opiliones) during winter diapause. *Arthropod structure & development*, ISSN 1467-8039, 2015, vol. 44, iaa. 2, str. 131-141.

LIPOVŠEK DELAKORDA, Saška, JANŽEKovič, Franc, NOVAK, Tone. Autophagic activity in the midgut gland of the overwintering harvestmen *Gyas annulatus* (Phalangiiidae, Opiliones). *Arthropod structure & development*, ISSN 1467-8039, 2014, vol. 43, iss. 5, str. 493-500.

LIPOVŠEK DELAKORDA, Saška, LETOFSKY-PAPST, Ilse, HOFER, Ferdinand, PABST, Maria Anna, DEVETAK, Dušan. Application of analytical electron microscopic methods to investigate the function of spherites in the midgut of the larval antlion *Euroleon nostras* (Neuroptera: Myrmeleontidae). *Microscopy research and technique*, ISSN 1059-910X, 2012, vol. 75, iss. 4, str. 397-407.

NYQVIST, Daniel, SPEIER, Stephan, RODRIGUEZ-DIAZ, Rayner, MOLANO, R. Damaris, LIPOVŠEK DELAKORDA, Saška, RUPNIK, Marjan, DICKER, Andrea, ILEGEMS, Erwin, ZHR-akrawi, Elsie, MOLINA, Judith, LOPEZ-CABEZA, Maite, VILLATE, Susana, ABDULREDA, Midhat, RICORDI, Camillo, CAICEDO, Alejandro, PILEGGI, Antonello, BERGGREN, Per-Olof. Donor islet endothelial cells in pancreatic islet revascularization. *Diabetes*, ISSN 0012-1797, 2011, vol. 60, no. 10, str. 2571-2577.